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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,658	01/31/2002	Mark Philip D'Evelyn	121655	1463

6147 7590 04/18/2007

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
LEUNG, JENNIFER A	
ART UNIT	**PAPER NUMBER**
1764	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
2 MONTHS	04/18/2007	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/683,658
Filing Date: January 31, 2002
Appellant(s): D'EVELYN ET AL.

Shawn A. McClintic
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 18, 2006 appealing from the Office action mailed July 18, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The Examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The Appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

The Appellant (under the second ground of rejection to be reviewed on appeal) has indicated that claims 104-106, 112, 130, 145 and 154 were rejected under 35 U.S.C. §102 as being anticipated by Wilson et al. (US 3,473,935). However, please note that only claims 104-105, 112, 130, 145 and 154 were rejected accordingly.

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the Examiner:

The rejection of claims 150-152 under 35 U.S.C. 112, second paragraph.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 3,473,935	WILSON et al.	10-1969
US 2,947,610	HALL et al.	08-1960
US 3,567,643	FLANIGEN et al.	03-1971

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 104, 105, 112, 130, 145 and 154 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson et al. (US 3,473,935).

Regarding claim 104, Wilson et al. (FIG. 1, 2) discloses an apparatus comprising: a capsule having an interior surface defining a volume (i.e., closed and sealed capsule **31**, defining a chamber; column 2, line 61 to column 3, line 7), wherein the capsule is configured to receive a material and a fluid in the capsule volume (i.e., the capsule is capable of receiving a material **29** to be crystallized, and water in an amount not exceeding about 6.5 wt percent of the material; column 4, lines 2-20);

a restraint (i.e., core **16**) having an interior surface defining a chamber receiving capsule **31**; and an energy source operable to supply thermal energy to the capsule **31** (i.e., a heating element comprising a carbon cylinder **33** proximate to said capsule **31**, and a wattage control system comprising conductors **39** and **40** electrically coupled to said heating element **33**; column 3, lines 45-54).

Because the apparatus is configured to obtain pressures of up to 60,000 atmospheres in the capsule (column 3, lines 43-44) and temperatures of up to about 2000 °C (see Examples I-VI) in the capsule, the fluid (i.e., water) added to the capsule **31** is inherently operable to become supercritical at a predetermined temperature and a predetermined pressure, because water is known to be supercritical above approximately 374 °C and approximately 22.06 MPa. Please note that the particular pressures and temperatures selected within the operable ranges are considered process variables that add no further patentable weight to the apparatus claim.

Regarding claim 105, the restraint **16** is operable to counterbalance the pressure in the capsule **31**, and the restraint **16** being is immobile relative to the capsule **31** while counterbalancing the capsule **31** pressure (i.e., given that water, when heated to the disclosed temperatures under the constant volume of the capsule, inherently expands to thereby pressurize the inside of the capsule to the disclosed pressures; see examples I-III).

Regarding claims 112 and 154, Wilson et al. discloses a clamp (i.e., binding rings **11-15**) in contact with the restraint **16**, operable to reduce a pressure load on at least a portion of the restraint **16** that causes longitudinal stress on the restraint portion.

Regarding claim 130, as defined in section [0032] of the specification, the "pressure response" is the "percent increase in cell pressure divided by the percent increase in press force

that produces the increased cell pressure, relative to a reference operation condition." Such are variables of an intended process. The apparatus of Wilson et al. structurally meets the claims because the "pressure response" is not considered an element of the apparatus.

Regarding claim 145, the capsule **31** and the restraint **16** are inherently capable of maintaining a seal to the fluid (i.e., water) at a given internal pressure and at a corresponding temperature, as evidenced by the synthesis of Beryl crystals with the addition of water, under the disclosed temperatures and pressures of Examples I-III. (Clearly, one would not include water in the capsule under the disclosed temperature and pressure conditions if water leaked out of the capsule). Please note that the claimed limitation relating to the fluid and its corresponding pressure within the capsule provides no further patentable weight to the claim because the fluid has not been considered an element of the apparatus.

Instant claims 104, 105, 112, 130, 145 and 154 structurally read on the apparatus of Wilson et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 106 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (US 3,473,935) in view of Hall et al. (US 2,947,610).

Wilson et al. discloses a heating system comprising an energy source (i.e., carbon tube **33**, electrically coupled to conductors **39** and **40**; column 3, lines 45-54). Wilson et al., however,

is silent as to the system further comprising a temperature sensor, disposed proximate to the capsule **31** and operable to sense the temperature of the capsule **31**. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a temperature sensor to the apparatus of Wilson et al., on the basis of suitability for the intended use, because the examiner takes Official Notice that it is well known in the art to provide temperature sensors to apparatus in order to enable the monitoring and/or controlling of process variables, as evidenced by Hall et al. In particular, Hall et al. (see column 7, lines 18-63) teaches an apparatus, similar to the apparatus of Wilson et al., wherein the temperature in a reaction vessel **32** is determined by fairly conventional means of placing a thermocouple in the reaction vessel and measuring the temperature in the usual manner. Electrical energy at a predetermined rate is then supplied to the apparatus, and the temperature produced by this power is measured by the thermocouple. The same procedure is repeated with different power inputs to produce a calibration curve of power input versus the temperature in the reaction vessel. The temperature within reaction vessel **32** is thus controlled in a "closed loop" fashion according to the power input to the apparatus in conjunction with the calibration curve.

3. Claims 146-153 and 155 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (US 3,473,935) in view of Flanigen (US 3,567,643).

Regarding claims 146, 147 and 155, Wilson et al. (FIG. 1, 2) discloses an apparatus for synthesizing beryl, comprising:

a capsule having an interior surface defining a volume (i.e., closed and sealed capsule **31**, defining a chamber; column 2, line 61 to column 3, line 7), wherein the capsule is configured to receive a material and a fluid in the capsule volume (i.e., the capsule is

capable of receiving a material **29** to be crystallized, and water in an amount not exceeding about 6.5 wt percent of the material; column 4, lines 2-20);

a restraint (i.e., core **16**) having an interior surface defining a chamber receiving capsule **31**; and an energy source operable to supply thermal energy to the capsule **31** (i.e., a heating element comprising a carbon cylinder **33** proximate to said capsule **31**, and a wattage control system comprising conductors **39** and **40** electrically coupled to said heating element **33**; column 3, lines 45-54).

The apparatus is configured to obtain pressures of up to 60,000 atmospheres (column 3, lines 43-44) and temperatures of up to about 2000 °C (see Examples I-VI) in the capsule.

Wilson et al., however, is silent as to whether the material and the fluid may comprise an amount of metal material and an amount of ammonia.

Flanigen teaches the synthesis of single crystals having the structure of beryl, and particularly beryl analogs doped with transition metal or rare earth metal ions (column 3, lines 67-74). The material and fluid selected for synthesizing the product comprises aluminum and ammonia (see column 4, lines 3-17 and 65-69; column 5, lines 47-71). Flanigen teaches that,

> "Since the process of this invention is a hydrothermal process which is conducted at elevated temperatures and pressures, the process is most easily conducted in a sealed reaction vessel, autoclave or bomb of a type well known in the hydrothermal art of crystal synthesis. A variety of these reaction vessels are commercially available and are highly suitable for use in practice of this invention." (column 4, lines 32-39).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the metal and ammonia as taught by Flanigen for the material and fluid being processed by the apparatus of Wilson et al., on the basis of suitability for conducting an intended

process of synthesizing other known beryl structured compounds. The apparatus of Wilson et al. would have been suitable for conducting the crystal synthesis using metal and ammonia as taught by Flanigen because apparatuses of the type disclosed by Wilson are well known in the hydrothermal art of crystal synthesis.

The ammonia that would be added to the capsule is inherently operable to become supercritical ammonia, because ammonia the temperature and pressure at which the ammonia becomes supercritical falls within the operable pressure and temperature ranges of the apparatus. Please note that the particular pressures and temperatures selected within the operable ranges are considered process variables that add no further patentable weight to the apparatus claim.

Regarding claims 148, 149 and 153, a temperature and pressure sufficient to form aluminum nitride is achievable by the apparatus of Wilson et al. (i.e., said temperature and said pressure falls within the operable temperature and pressure ranges cited above).

Regarding claims 150-152, Applicants are attempting to claim a product which is to be synthesized by the apparatus. However, the recitation of a material worked upon does not limit apparatus claims (see MPEP 2115). Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)). In *In re Young,* a claim to a machine for making concrete beams included a limitation to the concrete reinforced members made by the machine as well as the structural elements of the machine itself. The court held that the inclusion of the article formed

within the body of the claim did not, without more, make the claim patentable. The modified apparatus of Wilson et al. thus meets the claims.

(10) Response to Argument

Comments regarding the rejection of claims 150-152 under 35 U.S.C. 112, second paragraph

Appellants' arguments (see bottom of page 4 to top of page 5) as to whether claims 150-152 are indefinite under 35 U.S.C. 112, second paragraph, have been fully considered by the Examiner. However, the arguments are moot because the rejection has been withdrawn.

Please note that although the claims are no longer considered indefinite, the recitations with respect to the "metal nitride composition", the "single crystal metal nitride composition" and the "aluminum nitride" have not been given patentable weight, because they are merely products formed by the apparatus, and therefore not considered part of the apparatus.

Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963).

Comments regarding the rejection of claims 104, 105, 112, 130, 145 and 154 under 35 U.S.C. 102(b) as being anticipated by Wilson et al. (US 3,473,935)

Appellants (on page 5, beginning at line 16) argue,

> "The core 16 indicated in the Office Action as anticipating the restraint is not bounded on at least two sides as shown in Fig. 1. The top and the bottom of the core 16 of Wilson et al are open. The core 16 of Wilson et al. provides, at best, two-dimensional

> control, and cannot provide three-dimensional control. "Volume" is a three-dimensional unit. A prior art element having both the function and structure of the restraint as defined in the independent claim is not shown. Accordingly, Appellant expects that a rejection based on an accumulation of prior art elements (the core 16 plus the two press pistons 23 and 24, or the core 16 plus the rings 11-15) would similarly not anticipate the independent claim. In summary, there is no corresponding structure in the cited art that has the structure and performs the function of at least one of the elements in each of the independent claims."

The Examiner respectfully disagrees. Firstly, although the top and bottom of the core **16** in Wilson et al. are open during the capsule loading stage, during the operation of the apparatus, the top and bottom of the core **16** are closed off to thereby form a chamber containing said capsule, by cooperation of the core **16** with a top piston **23** having an end element **26** and a bottom piston **24** having an end element **27** (see Wilson et al., FIG. 1; column 3, lines 8-44). This provides a "three-dimensional" control of the chamber volume, with two dimensions of the control being provided by the core **16** and the third dimension of the control being provided by the opposing press pistons **23**,**24**.

Secondly, it is unclear as to how the core **16** used in combination with the two pistons **23** and **24** as disclosed by Wilson et al. (see FIG. 1) differs structurally from Appellant's own restraint system. In particular, it is noted that the present specification (see page 10, sections [0029] and [0030]) sets forth that Appellant's restraint system **24** may comprise,

> "... any number of combined devices such as, but not limited to, hydraulic presses, plates, clamps, belts, dies, punches, anvils, pistons, or the like," and
>
> "In one embodiment, restraint **24** includes a uniaxial hydraulic press (not shown), a pair of opposing punches (for example, top punch **100** and bottom punch **102**), a die **104**, and at least one compression ring **106**."

Looking now to Appellant's FIG. 1, it can be seen that the restraint system **24**, according to the "one embodiment" as discussed above, is substantially identical to the restraint system disclosed by the prior art to Wilson et al. (see column 3, lines 7-22 and FIG. 1). Appellant's die **104** structurally and functionally parallels Wilson et al.'s tungsten carbide core **16**. Appellant's opposing top punch **100** and bottom punch **102** structurally and functionally parallels Wilson et al.'s top press piston **23** and bottom press piston **24**, respectively. Appellant's uniaxial hydraulic press (not shown) structurally and functionally parallels Wilson et al.'s hydraulic press (also not shown), used for biasing the pistons **23** and **24** uniaxially towards one another. Also, Appellant's at least one compression ring **106** structurally and functionally parallels Wilson et al.'s concentric binding rings **11-15**.

Given that both the restraint systems of Appellant and Wilson et al. are substantially identical, it is unclear as to how the restraint system **16/23/24** of Wilson et al. could function any differently than Appellant's own restraint system **24**. Hence, the Examiner maintains the apparatus of Wilson is structurally capable of maintaining the chamber as defined by the restraint system at a "substantially constant volume", in a similar manner to Appellant's own restraint system.

Appellant (at page 5, beginning at line 27, to page 6, line 16) then appears to argue that Wilson et al. fails to anticipate the claim, because patentable weight has not been given to the "supercritical fluid". The Examiner respectfully disagrees. Firstly, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the

instant case, the apparatus of Wilson et al. is structurally capable of processing a fluid, such that "the fluid is operable to become supercritical at least at the determined temperature and the determined pressure," as recited in claim 104. In particular, Wilson et al. discloses that the apparatus is structurally capable of obtaining pressures of up to 60,000 atmospheres in the capsule (column 3, lines 43-44) and temperatures of up to about 2000 °C in the capsule (see Examples I-VI). In addition, the capsule **31** in Wilson et al. is structurally capable of containing a fluid, given that water may be added to the contents of the capsule (see column 4, lines 2-10). The water is inherently "operable to become supercritical", since it is known that water is supercritical above approximately 374 °C and approximately 22.06 MPa (about 218 atm), and both the critical temperature and critical pressure of water are well within the operating ranges of the Wilson et al. apparatus.

Secondly, please note that expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963).

Appellant (at page 6, lines 17-22) argues,

> "Claim 105 states "the restraint is operable to counterbalance pressure in the capsule." Wilson et al. discloses the core 16 is a tungsten carbide core... the bores, and counterbores cooperate with the pistons "... to impose pressure on the sample..." Appellant has gone to great lengths to indicate that actively imposing pressure differs from providing a counterbalancing pressure. The Office Action would vitiate that distinction."

The Examiner respectfully disagrees and maintains that the apparatus of Wilson et al. structurally meets the claims. As indicated above, since both the restraint systems of Appellant and Wilson et al. are substantially identical, it is unclear as to how the restraint system **16/23/24** of Wilson et al. could function any differently than Appellant's own restraint system **24**. Appellant's die **104** structurally and functionally parallels Wilson et al.'s tungsten carbide core **16**. Appellant's opposing top punch **100** and bottom punch **102** structurally and functionally parallels Wilson et al.'s top press piston **23** and bottom press piston **24**, respectively. Appellant's uniaxial hydraulic press (not shown) structurally and functionally parallels Wilson et al.'s hydraulic press (also not shown), used for biasing the pistons **23** and **24** uniaxially towards one another. Also, Appellant's at least one compression ring **106** structurally and functionally parallels Wilson et al.'s concentric binding rings **11-15**.

Appellants have not provided sufficient evidence or persuasive argument as to why the restraint system of Wilson et al., having all of the required structural elements, would not be capable of operating according to the manner as claimed. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Appellant (at page 6, last paragraph, to page 7) argues,

> "... Claim 130 defines functionally the quality, character or attribute of the restraint that is measurable as a pressure response. The "pressure response" is an inherent property of the restraint. For example, if an exemplary non-inventive capsule was placed in a moving press and did not self-pressurize – then for every percent increase in the dynamic press force there would be a corresponding non-linear increase in the capsule pressure. By contrast, if a self-pressurizing capsule were placed in a dynamic

> press then an increase in force from the dynamic press would increase the pressure both by direct pressure from the press and from the pressure from the self-pressurizing capsule. By way of further contrast, if a self-pressurizing capsule were placed in a static restraint subject to, for example, thermal expansion then the percent increase in pressure would differ relative to the other two postulated scenarios (all assume an increase in temperature or reference operating condition). In summation, the pressure response (or percentage ratios) differ based at least on the source of pressure. As such, the claim limitation indicates where the pressure originates, and is a legitimate element of the claimed apparatus. It is not a variable of an intended process."

The Examiner respectfully disagrees and maintains that the recitation that, "the restraint is operable to transmit pressure to the capsule such that the transmitted pressure to the capsule is measurable as a pressure response of the restraint and is less than about 0.2" is merely a recitation of the intended use of the claimed invention. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. As indicated above, since both the restraint systems of Appellant and Wilson et al. are substantially identical, it is unclear as to how the restraint **16/23/24** of Wilson et al. could function any differently than Appellant's own restraint system **24**. Appellant's die **104** structurally and functionally parallels Wilson et al.'s tungsten carbide core **16**. Appellant's opposing top punch **100** and bottom punch **102** structurally and functionally parallels Wilson et al.'s top press piston **23** and bottom press piston **24**, respectively. Appellant's uniaxial hydraulic press (not shown) structurally and functionally parallels Wilson et al.'s hydraulic press (also not shown), used for biasing the pistons **23** and **24** uniaxially towards one another. Also, Appellant's at least one compression

ring **106** structurally and functionally parallels Wilson et al.'s concentric binding rings **11-15**.

Appellants have not provided sufficient evidence or persuasive argument as to why the restraint system of Wilson et al., having all of the required structural elements, would not be capable of operating according to the manner as claimed.

Furthermore, the present specification (see page 12, section [0032]) defines the "pressure response" of the apparatus as,

> "... the percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operating condition."

Such are variables of an intended process. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997); *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959); *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990).

Appellant (at page 7, lines 19-14) argues,

> "Claim 145 depends from an allowable claim and defines a capsule that can exert an internal a pressure of greater than about 60 kBar. Pressure limits for capsules or cells in Wilson et al. are disclosed to be up to 60 kBars.... For at least claim 145, Wilson et al. does not disclose or enable a pressure capability approaching the claim definition."

The Examiner respectfully disagrees. Wilson et al. discloses that the capsule and the restraint are cooperatively configured to maintain a seal on the capsule for an internal pressure of up to 60,000 atmospheres (see column 3, lines 43-45). An internal pressure of 60,000 atmospheres is

equivalent to approximately 60.8 kbar (please note that 1 atm = 1.013 bar). An internal pressure of up to 60.8 kbar is within the claimed range of "greater than about 60 kbar".

Comments regarding the rejection of claim 106 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (US 3,473,935) in view of Hall et al. (US 2,947,610).

Appellant (at page 7, last paragraph, to page 8, first paragraph) argues,

> "... Clearly, Wilson et al did not believe a sensor was necessary, otherwise they would have disclosed one. Similarly, Hall et al. does not disclose other elements of the claimed invention because that was not the intent or understanding of Hall et al. For the cited art to be combined, without the benefit of impermissible hindsight reconstruction, there must be some reason or motivation provided beyond mere "because it is well known in the art to connect a control system with a temperature sensor to enable precise, closed loop control of the reaction temperature. The closed loop control is disclosed in claim 106, and not disclosed in Wilson et al. Hall et al. provides no insight as to whether a control system as disclosed therein would be a boon to the invention of Wilson et al., or even if the combination would be basically functional to carry out the reaction of Wilson et al. who did not appear to need the modification the Office Action suggests."

The Examiner respectfully disagrees. Firstly, in response to Appellant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Secondly, in response to Appellant's argument that there is no suggestion to combine the references, the Examiner

recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the Examiner asserts that the benefits of providing a temperature sensor to a reactor for enabling automated and precise control of reactor conditions is knowledge generally available to one of ordinary skill in the art. Clearly, one having ordinary skill in the art would have been motivated to provide a temperature sensor for the reactor in order to determine whether a desired reaction temperature had been met. Furthermore, the added efficiency obtained from the automated and precise control of reaction conditions would be one well-known reason and motivation for making the above combination. Hall et al. further evidences conventionality by teaching that, "The temperature in the reaction vessel is determined by *fairly conventional means* such as by placing a thermocouple junction in the reaction vessel and measuring the temperature of the junction *in the usual manner*. (see column 7, lines 18-21). The provision of a sensor for enabling the measurement of reactor temperature (and subsequent control of reactor temperature) is therefore conventionally known in the art, and no cause for patentability here.

Appellant (page 8, lines 18-23) further argues,

> "... an explanation would be useful as to why one of ordinary skill in the art would take a simple and functional apparatus as shown in Wilson et al. and start adding components and control systems to increase the complexity and cost. As no such explanation has been proferred, Appellant submits that a prima facie case of obviousness has not been made, the rejection should be withdrawn, and a notice to that effect is respectfully requested."

The Examiner respectfully disagrees. Again, as stated above, the benefits of providing a temperature sensor to a reactor for enabling automated and precise control of reactor conditions is knowledge generally available to one of ordinary skill in the art. The added efficiency obtained from the automated and precise control of reaction conditions would be one well-known reason and motivation for making the above combination.

The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990); *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985); and *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). Also, the strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. *In re Sernaker*, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983)

Lastly, the fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility. *In re Farrenkopf*, 713 F.2d 714, 219 USPQ 1 (Fed. Cir. 1983).

Comments regarding the rejection of claims 146-153 and 155 under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (US 3,473,935) in view of Flanigen (US 3,567,643)

Appellant (page 8, last paragraph, to page 9, line 3) argues,

> "... Claim 146 defines a structure capable of maintaining a seal at a pressure range of from 5 kBar (about 75,000 psi) to about 80 kBar. Flanigen et al. shows an example of not more than 20,000 psi as indicated in the Office Action. It is not reasonable for one of ordinary skill in the art to expect that a seal designed for use at a low pressure would be a suitable replacement for a situation that requires a minimum of about 3 times more pressure. It is not obvious what seal or seal mechanism would be sufficient for the different and extreme pressures, such as those defined in claim 146."

The Examiner respectfully disagrees. Please note that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, the primary reference to Wilson et al. was relied upon for the teaching of an apparatus comprising a capsule that is functionally capable of maintaining a seal at a pressure from about 5 kBar to about 80 kBar (i.e., Wilson et al.'s apparatus is configured to obtain pressures of up to 60,000 atmospheres (column 3, lines 43-44) and temperatures of up to about 2000 °C (see Examples I-VI) in the capsule). The secondary reference to Flanigen, however, was merely relied upon to illustrate that the use of reactants, such as an aluminum metal and ammonia (see column 4, lines 3-17 and 65-69; column 5, lines 47-71), for synthesizing other known beryl structured compounds, is conventional in the art.

In any event, expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, inclusion of a material or article

worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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